future tense

What Can Ancient Cities Teach Us About Surviving Climate Change?

BY MICHAEL E. SMITH

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An elite residential compound at Teotihuacan called the Palace of the Sun, with the Pyramid of the Sun in the background. This compound, like most of the buildings at Teotihuacan, was burned and abandoned around 600 CE. Michael E. Smith

Aztec Tenochtitlan began as a damp town in the middle of a swamp, but it managed to thrive across conquests, epidemics, droughts and floods to become one of the largest cities in the world today—Mexico City. When taking students to see the Aztec ruins next to the Zocalo, I used to wonder how places like Tenochtitlan, Beijing, or Rome (the "eternal city") managed to thrive for centuries, while other cities failed.

In my archaeological fieldwork, I have encountered far more failed urban sites than cities that survived for centuries. It is now time to examine these early cities to learn how some of them adapted successfully to stresses and shocks, while others did not. Perhaps this knowledge can inform current work on urban adaptations to climate change. Researchers have identified a "knowledge gap" between what we need to know about planning cities for the future and we do know. The cities of the past can help fill that gap.

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Much of the research, policy work, and governmental action done under the banner of "sustainability" are better labeled "aspirational sustainability"—particularly because we have little idea how things will play out in the long run. True sustainability means that cities, societies, and institutions will survive, not just another five years, but long into the future. How can we design policies and strategies for adaptation without understanding urban change over longer periods?

The archaeological and historical records are untapped sources of information on urban adaptations over the long run. My colleagues and I have located thousands of early urban settlements that lasted for many centuries, as well as thousands that lasted for much shorter periods. Some of these cities are still thriving today (such as Rome and Mexico City), while others collapsed centuries ago (such as Teotihuacan in Mexico and Angkor in Cambodia). Any city that lasts hundreds of years has overcome resource problems, weathered shocks and stresses, and solved the collective-action problems of people living and working together. In short, long-lived cities must have been well adapted to their social and natural settings—and we need to study them to see if we can determine what factors contributed to long-term urban success in the ancient world, and what challenges led to short-term failures. Archaeologists and historians have the data, but we have not yet done the scientific work to analyze it adequately. Perhaps this material will not contain any suitable lessons at all. But, just maybe, it can contribute something unique to knowledge and practice today.

Historians and archaeologists have already started to weigh in on climate change adaptations. One popular genre is stories about disasters like the Classic Maya collapse (think Jared Diamond's 2005 book *Collapse*, or *The Next Apocalypse*, by Chris Begley, 2021). While ancient catastrophes make good reading, such stories are both too complicated and too limited to draw firm conclusions. They promote a biased view of ancient societies. People wonder what was wrong with Maya cities: Why did they collapse? Yet those same cities flourished for many centuries, far longer than any city in the U.S. has yet endured.

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Groups of historians are starting to move beyond this infatuation with collapse to instead draw connections between past and present with titles such as "Lessons From the Past, Policies for the Future: Resilience and Sustainability in Past Crises." These studies typically describe several case studies of short-term processes (for instance, the Black death or Roman conquest) and claim they provide lessons for us today. The cases are anecdotes; they are not formally compared, nor are they analyzed quantitatively. Yet economists have found that when they look at cities over a longer historical perspective, they are remarkably resilient to plagues, wars, and other short-term catastrophes. After an initial setback, cities almost always come back, economically, demographically, and culturally.. But, what happens if we look at changes over a really long interval, one lasting centuries or even millennia, what the great historian Fernand Braudel called the *longue durée*?

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The principle strengths of archaeology are a record of change over centuries, even millennia, and a large enough sample of sites and regions to create a quantitative and rigorous science of past adaptations to shocks and change. Archaeologists now routinely apply quantitative, scientific methods to topics such as wealth inequality, city size, and trade patterns. It is time to extend these methods to urban adaptations to stresses and shocks, including both climatic changes and other natural and social forces.

I am part of a research group at Arizona State University that has begun to use archaeological data to address urban survival and adaptation over long periods. (Disclosure: ASU is a partner with Slate and New America in Future Tense.) In contrast to aspirational sustainability, we take a rather stark view of ancient urban sustainability: If a city or settlement managed to survive for many centuries, then it was sustainable. I recently returned to the results of an archaeological survey I directed in the Yautepec Valley of Mexico in the 1990s, to see if they might shed any light on climate-change adaptations and sustainability today. I think they do. My students and I walked across the landscape and located some 400 sites—places on the landscape where people once lived. Our chronology is rough, with time periods that last one or two centuries. Some sites were occupied for just a single period of time, while others were occupied for many millennia. What was the difference between those that survived and those that did not?

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One finding that relates to urban issues today is the effects of city size on adaptation and sustainability. The median persistence of settlements in the Yautepec Valley was 370 years, a high rate of urban success by any measure. Looking more closely at the data, it is clear that larger settlements typically lasted longer than smaller ones. Several patterns stand out. The earliest urban centers in this area were founded adjacent to the best farmland, in the first century BCE. These large centers thrived for more than a millennium. Their superior locations undoubtedly contributed to their persistence and success. The conquest of the valley by the Teotihuacan empire (around 150 CE), however, showed that major political transformations can be more important than city size in explaining persistence. This event set off a flurry of urbanization as new administrative centers sprung up throughout the valley. These towns probably helped administer the cultivation of cotton for Teotihuacan. When Teotihuacan withdrew three centuries later, these towns were abandoned. Their size (larger than other settlements at the time) was no help when their administrative purpose came to an end. Does the more general role of size as a stimulus to sustainability extend to other early urban systems? If so, this may help scholars and planners work out the optimum size for cities in order to ensure sustainability into the future. Planners already associate higher urban population density with greater sustainability. If larger size is also more sustainable, then perhaps the current trend of shrinking cities in many regions needs immediate policy help. Economists have shown that larger cities generate more growth per capita than smaller cities, and this finding has been replicated for ancient cities. It would not be surprising if these city-size effects also created cities more able to withstand shocks and survive into the future.

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Two obstacles must be overcome before scientists and planners can use insights from ancient history and archaeology. First, my colleagues and I need to reanalyze our data with respect to persistence over time. Just what conditions (city size, infrastructure, institutions) promoted urban persistence in the past? Can such results be translated for urban adaptations today? This is not a trivial task. Just reconfiguring the Yautepec data to look at the persistence of settlements through time required dedicated labor by a postdoc and graduate student. Second, urban adaptation scholars and archaeologists need to come together to establish specific useful connections between the patterns and processes identifiable for ancient cities, and the factors promoting or hindering the adaptations of cities to climate change today. Archaeologists can analyze many attributes of cities and settlement systems beyond their size

and persistence; we welcome suggestions on what to do next.

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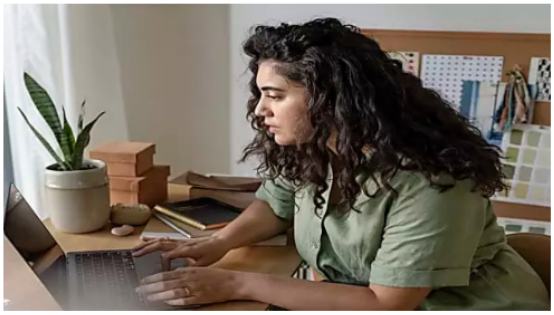

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